

I CLAIM:

1. A fast-fluidized bed reactor for the conversion of a feedstream comprising an oxygenate by contact with fluidized catalyst particles to produce a product stream comprising light olefins, said reactor comprising:

5 a reaction vessel defining a disengaging zone, a lower subadjacent reaction zone, a product outlet for withdrawing the product stream from the disengaging zone, and a feed inlet communicating with the lower reaction zone;

a partition sealingly disposed about an intermediate portion of the reaction vessel to segregate the reaction zone from the disengaging zone;

10 a riser extending vertically within the reaction vessel from the reaction zone into a central section of the disengaging zone, in fluid communication with the reaction zone, for conducting the product stream and fluidized catalyst particles and defining a discharge opening within said disengaging zone for discharging the product stream and fluidized catalyst particles, said discharge opening being tangentially oriented for imparting a tangential velocity to the product stream and fluidized catalyst particles;

15 a separation vessel disposed over said riser in the disengaging zone and surrounding said discharge opening to separate gaseous products from fluidized catalyst particles, said separation vessel having a lower portion defining a particle outlet for discharging fluidized catalyst particles and said separation vessel defining a gas recovery outlet for withdrawing gaseous fluids from the separation vessel;

20 a dense phase zone defined by a portion of the reaction zone located below said intermediate portion of the reaction zone;

25 at least one catalyst recirculation standpipe for conveying fluidized catalyst particles from the disengaging zone to the dense phase zone;

a spent catalyst standpipe in fluid communication with the disengaging zone for removing fluidized catalyst particles from the disengaging zone; and

a regenerated catalyst standpipe for delivering regenerated catalyst particles to an intermediate portion of the reaction zone.

5        2. The fast-fluidized bed reactor of claim 1 further comprising a feed distributor disposed over the feed inlet supporting a dense phase zone in the lower reaction zone.

3. The fast-fluidized bed reactor of claim 2 wherein the feed distributor comprises a flat sieve plate.

10       4. The fast-fluidized bed reactor of claim 1 further comprising at least one cyclone separation stage located within the disengaging zone in fluid communication with the gas recovery outlet;

15       5. The fast-fluidized bed reactor of claim 1 wherein the gas recovery outlet is in fluid communication with at least one cyclone separation stage, the cyclone separation stage being in fluid communication with the product outlet.